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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	L.R. Dalton et al.	Attorney Docket No.:	UOFW117403
Application No.:	09/912,444	Group Art Unit:	2874
Filed:	July 24, 2001	Examiner:	--
Title:	HYPERPOLARIZABLE ORGANIC CHROMOPHORES		

PRELIMINARY AMENDMENT

Seattle, Washington 98101

February 28, 2002

TO THE COMMISSIONER FOR PATENTS:

Prior to examination, please amend the above-identified application as indicated below.

In the Specification:

Please amend the paragraph on page 40, beginning at line 15, as follows:

The electro-optic coefficient (picometers/volt, pm/V, at 1.3 microns), r_{33}, as a function of chromophore loading (weight percent) was determined as described above for a corresponding chromophore having a tricyanofuran acceptor in amorphous polycarbonate. The results are illustrated in FIGURE 18. Referring to FIGURE 18, the greatest electro-optic coefficient (66 pm/V) was measured at 30 weight percent chromophore and electro-optic coefficients of 64 pm/V were achieved for loadings of 28 and 35 weight percent chromophore. Electro-optic coefficients of 47 and 57 pm/V were achieved at 20 and 30 weight percent chromophore, respectively.

In the Claims:

Please cancel Claims 1-8.

Add Claims 9-64 as follows:

9. (New) A compound, comprising a π–electron donor conjugated to a π–electron acceptor through a π–conjugated polyene bridge, the compound having an electro-optic coefficient of at least about 50 pm/V measured at 1.3 or 1.55 μm in polymethylmethacrylate with

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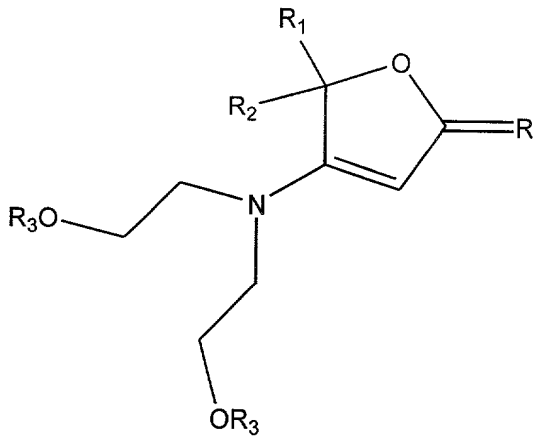
a compound loading of about 25% by weight based on the total weight of polymethylmethacrylate.

10. (New) The compound of Claim 9, wherein the donor comprises an amino donor.

11. (New) The compound of Claim 9, wherein the donor comprises an amino group conjugated to the polyene through an α,β-unsaturated cyclic ester equivalent having the structure:



wherein R_1 and R_2 are alkyl groups, R_3 is a bulky substituent, and R represents the rest of the compound.

12. (New) The compound of Claim 9, wherein the donor comprises an amino group conjugated to the polyene through an α,β-unsaturated cyclic ether equivalent having the structure:

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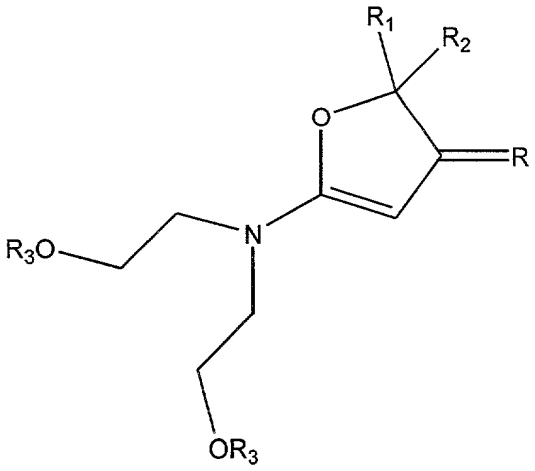
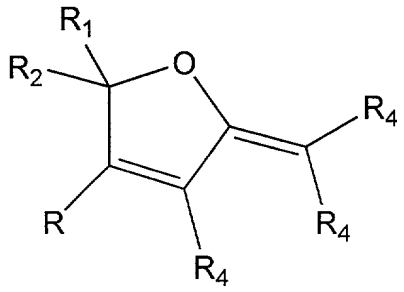


wherein R_1 and R_2 are alkyl groups, R_3 is a bulky substituent, and R represents the rest of the compound.

13. (New) The compound of Claim 9, wherein the donor comprises a bulky substituent to inhibit chromophore aggregation.

14. (New) The compound of Claim 9, wherein the acceptor comprises a cyanofuran acceptor.

15. (New) The compound of Claim 9, wherein the acceptor comprises a furan group having the structure:



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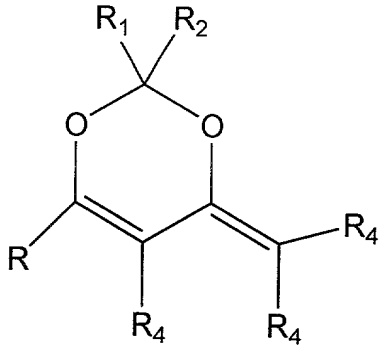
wherein R_1 and R_2 are alkyl groups, R_4 is independently selected from F, CN, CF_3, and CF_3SO_2, and R represents the rest of the compound.

16. (New) The compound of Claim 9, wherein the acceptor comprises a furan group having the structure:



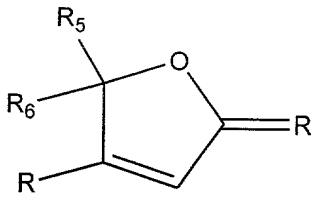
wherein R_1 and R_2 are alkyl groups, R_4 is independently selected from F, CN, CF_3, and CF_3SO_2, and R represents the rest of the compound.

17. (New) The compound of Claim 9, wherein the acceptor comprises a bulky substituent to inhibit chromophore aggregation.

18. (New) The compound of Claim 9, wherein the bridge comprises a bulky substituent to inhibit chromophore aggregation.

19. (New) The compound of Claim 9, wherein the π–conjugated polyene bridge comprises a dihydrofuran group.

20. (New) The compound of Claim 9, wherein the π–conjugated polyene bridge comprises a dihydrofuran group having the structure:



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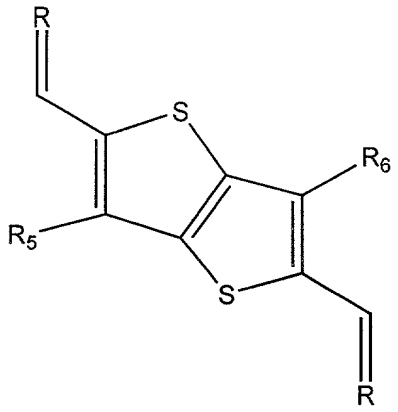
wherein R_5 and R_6 are selected from alkyl groups, and R represents the rest of the compound.

21. (New) The compound of Claim 9, wherein the π–conjugated polyene bridge comprises a fused dithiophene group.

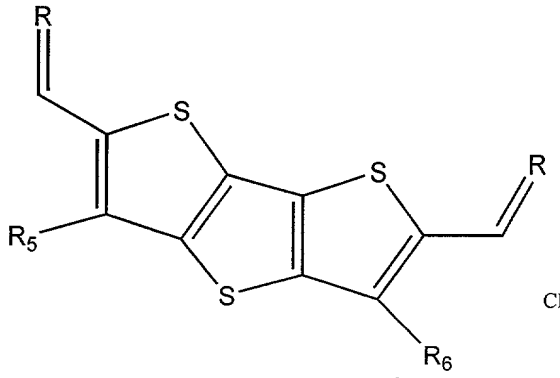
22. (New) The compound of Claim 9, wherein the π–conjugated polyene bridge comprises a fused dithiophene group having the structure:



wherein R_5 and R_6 are selected from alkyl, t-butyldimethyl silyl, and perfluoropropyldimethyl silyl groups, and R represents the rest of the compound.

23. (New) The compound of Claim 9, wherein the π–conjugated polyene bridge comprises a fused trithiophene group.

24. (New) The compound of Claim 9, wherein the π–conjugated polyene bridge comprises a fused trithiophene group having the structure:



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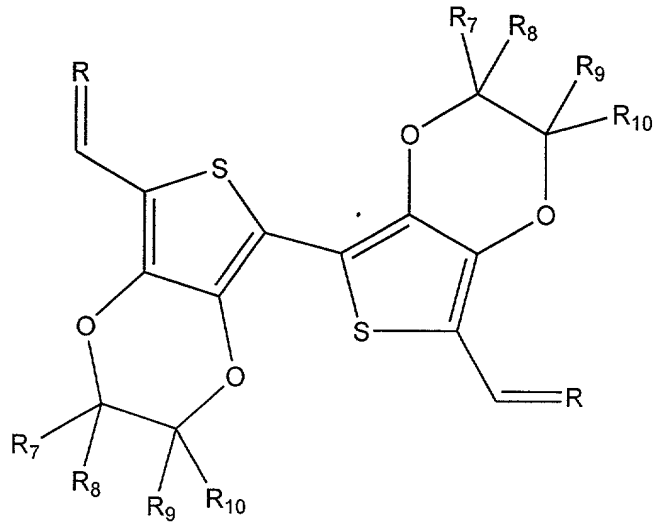
wherein R_5 and R_6 are alkyl groups, and R represents the rest of the compound.

25. (New) The compound of Claim 9, wherein the π–conjugated polyene bridge comprises a dithiophene group.

26. (New) The compound of Claim 9, wherein the π–conjugated polyene bridge comprises a dithiophene group having the structure:



wherein R_7, R_8, R_9, and R_{10} are independently selected from hydrogen, alkyl, fluorine, and trimethylfluoro groups; and R represents the rest of the compound.

27. (New) The compound of Claim 9, wherein the π–conjugated polyene bridge comprises a substituted thiophene group.

28. (New) The compound of Claim 9, wherein the π–conjugated polyene bridge comprises a substituted thiophene group having the structure:

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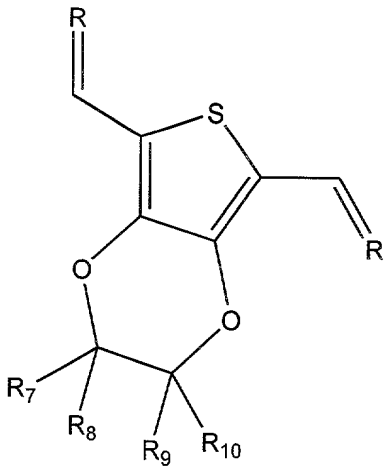
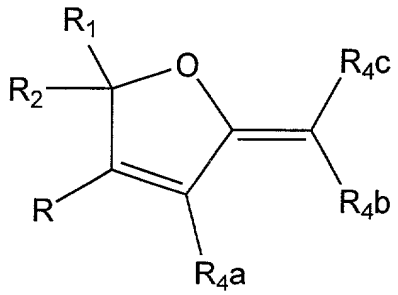


wherein R_7, R_8, R_9, and R_{10} are independently selected from hydrogen, alkyl, fluorine, and trimethylfluoro groups; and R represents the rest of the compound.

29. (New) A compound, comprising a π–electron donor conjugated to a π–electron acceptor through a π–conjugated polyene bridge, wherein the bridge comprises a fused dithiophene group.

30. (New) A compound, comprising a π–electron donor conjugated to a π–electron acceptor through a π–conjugated polyene bridge, wherein the bridge comprises a fused trithiophene group.

31. (New) A compound, comprising a π–electron donor conjugated to a π–electron acceptor through a π–conjugated polyene bridge, wherein the acceptor comprises a furan group having the structure:



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wherein R_1 and R_2 are alkyl groups, R_4a, R_4b, and R_4c are independently selected from F, CN, CF_3, and CF_3SO_2, provided that R_4a, R_4b, and R_4c are not all CN, and R represents the rest of the compound.

32. (New) The compound of Claim 31, wherein R_4a, R_4b, and R_4c are independently selected from F, CF_3, and CF_3SO_2.

33. (New) The compound of Claim 31, wherein R_4a is CN, R_4b is CN, and R_4c is CF_3SO_2.

34. (New) The compound of Claim 31, wherein R_4a is CF_3SO_2, R_4b is CN, and R_4c is CF_3SO_2.

35. (New) A macromolecular structure, comprising the compound of Claim 9.

36. (New) The macromolecular structure of Claim 35, wherein the structure is a dendrimer.

37. (New) The macromolecular structure of Claim 36, wherein the dendrimer comprises a crosslinkable dendrimer.

38. (New) The macromolecular structure of Claim 35, wherein the structure is a polymer.

39. (New) The macromolecular structure of Claim 38, wherein the polymer comprises a crosslinkable polymer.

40. (New) A macromolecular structure, comprising the compound of Claim 29.

41. (New) The macromolecular structure of Claim 40, wherein the structure is a dendrimer.

42. (New) The macromolecular structure of Claim 41, wherein the dendrimer comprises a crosslinkable dendrimer.

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43. (New) The macromolecular structure of Claim 40, wherein the structure is a polymer.

44. (New) The macromolecular structure of Claim 43, wherein the polymer comprises a crosslinkable polymer.

45. (New) A macromolecular structure, comprising the compound of Claim 30.

46. (New) The macromolecular structure of Claim 45, wherein the structure is a dendrimer.

47. (New) The macromolecular structure of Claim 46, wherein the dendrimer comprises a crosslinkable dendrimer.

48. (New) The macromolecular structure of Claim 45, wherein the structure is a polymer.

49. (New) The macromolecular structure of Claim 48, wherein the polymer comprises a crosslinkable polymer.

50. (New) A macromolecular structure, comprising the compound of Claim 31.

51. (New) The macromolecular structure of Claim 50, wherein the structure is a dendrimer.

52. (New) The macromolecular structure of Claim 51, wherein the dendrimer comprises a crosslinkable dendrimer.

53. (New) The macromolecular structure of Claim 50, wherein the structure is a polymer.

54. (New) The macromolecular structure of Claim 53, wherein the polymer comprises a crosslinkable polymer.

55. (New) A nonlinear optical device, comprising an active element including the compound of Claim 9.

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56. (New) A nonlinear optical device, comprising an active element including the compound of Claim 29.

57. (New) A nonlinear optical device, comprising an active element including the compound of Claim 30.

58. (New) A nonlinear optical device, comprising an active element including the compound of Claim 31.

59. (New) A dendrimer, comprising a chromophore having a π–electron donor conjugated to a π–electron acceptor through a π–conjugated polyene bridge, wherein the bridge comprises a thiophene group.

60. (New) A dendrimer, comprising a chromophore having a π–electron donor conjugated to a π–electron acceptor through a π–conjugated polyene bridge, wherein the bridge comprises a bithiophene group.

61. (New) A dendrimer, comprising a chromophore having a π–electron donor conjugated to a π–electron acceptor through a π–conjugated polyene bridge, wherein the bridge comprises a fused dithiophene group.

62. (New) A dendrimer, comprising a chromophore having a π–electron donor conjugated to a π–electron acceptor through a π–conjugated polyene bridge, wherein the bridge comprises a fused trithiophene group.

63. (New) A dendrimer, comprising a chromophore having a π–electron donor conjugated to a π–electron acceptor through a π–conjugated polyene bridge, wherein the acceptor comprises a furan group.

64. (New) A dendrimer, comprising the compound of Claim 1.

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REMARKS

By this amendment, Claims 1-8 have been canceled and Claims 9-64 have been added. Examination and allowance of Claims 9-64 are respectfully requested.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE FEBRUARY 28, 2002

In the Specification:

The paragraph on page 40, beginning at line 11 has been amended as follows:

The electro-optic coefficient (picometers/volt, pm/V, at 1.3 microns), r_{33}, as a function of chromophore loading (weight percent) was determined as described above for a corresponding chromophore having a tricyanofuran acceptor [this chromophore] in amorphous polycarbonate. The results are illustrated in FIGURE 18. Referring to FIGURE 18, the greatest electro-optic coefficient (66 pm/V) was measured at 30 weight percent chromophore and electro-optic coefficients of 64 pm/V were achieved for loadings of 28 and 35 weight percent chromophore. Electro-optic coefficients of 47 and 57 pm/V were achieved at 20 and 30 weight percent chromophore, respectively.

Claims 1 - 8 have been cancelled and Claims 9 - 64 have been added.

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